Remarks

By this Amendment, Applicants have added new claims 30-36. The Examiner's comments and rejections are addressed below.

Withdrawal of Claims 27 and 28

Applicants note that claims 21-29 are pending and that the Examiner has withdrawn claims 27 and 28 as pertaining to a housing geometry that is different from the elected species. While Applicants do not necessarily agree with the Examiner's conclusion, to expedite prosecution, Applicants have withdrawn claims 27 and 28, without prejudice.

Oath/ Declaration

The Examiner has stated that the oath or declaration submitted in this current application (Patent Application No. 10/014,619) is defective because it referred to a different application number (Patent Application No. 09/545,354). As the current application is a divisional application of parent Patent Application No. 09/545,354, Applicants believe that pursuant to 37 C.F.R. § 1.63(d)(1) a copy of the declaration from this parent application is sufficient.

37 C.F.R. § 1.63(d)(1) states that "[a] newly executed oath or declaration is not required ... for a divisional application, provided that: (i) the prior nonprovisional application contained an oath or declaration as prescribed by paragraphs (a) through (c) of this section, (ii) the . . . divisional application was filed by all . . . of the inventors named in the prior application, (iii) the specification and drawings filed in the . . . divisional application contain no matter that would have been new matter in the prior application, and (iv) a copy of the executed . . . declaration filed in the prior application, showing the signature . . . is submitted for the . . . divisional application.

Each of these requirements has been met. The prior nonprovisional application contained a proper declaration. The present divisional application was filed by all of the same inventors named in the prior parent application. The specification and drawings filed in the present application are the same as the prior parent application. And, a copy of the executed declaration filed in the prior parent application was submitted in the present divisional application. Therefore, Applicants respectfully request acceptance of the declaration as filed.

The 35 U.S.C. § 112 Rejection

The Examiner has rejected claims 21-26 and 29 under 35 U.S.C. § 112 first paragraph because there is no adequate or enabling disclosure of how such could be accomplished using the Applicant's invention. Specifically, the Examiner found that the limitation in Claim 21 of "a plurality of ultrasonic transducers that each produce omni directional ultrasonic waves and positioned on said outside surface of said housing" was not an adequate or enabling disclosure because it does not disclose how and in what manner each transducer, by itself, can produce said omni directional energy waves. (Applicants note that the claim language quoted by the Examiner is not the current claim language for Claim 21, which was amended and acknowledged by the Examiner in a Supplemental Amendment filed on April 9, 2003.) The Examiner stated that "there is neither an adequate description nor enabling disclosure as to how and in what manner **each** transducer, by itself, can produce said omni directional energy waves" (emphasis in original). Applicants respectfully traverse this rejection.

Page 5, lines 6-9, of the specification states: "The configuration of the transducer 22 produces radial pressure waves emanating from the rod 44 in all directions. Thus, the radially emanating pressure waves are referred to as omnidirectional." Clearly this refers to the production of omnidirectional waves from a single transducer and provides the necessary support for the language in claim 21. Moreover, the specification provides examples of suitable transducers that can produce omnidirectional energy waves, including PUSH-PULL transducers sold by Martin Walter Ultraschalltechnik, GMBH, Staubenhardt, Germany, (page 5, line 31 – page 6, line 1) and telsonic radiator (tube) transducers and sonotrode transducers (page 6, lines 8-11). Therefore, the specification does provide the requisite description and enablement for Claim 21, and Applicants respectfully request withdrawal of this rejection.

The 35 U.S.C. § 103(a) Rejections

The Examiner has rejected claims 21-26 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Kato *et al.* or Yokokawa *et al.* in view of the combination of Scharton *et al.* and Walter *et al.* Applicants respectfully traverse this rejection. (Applicants note that the Examiner has particularly applied Scharton for the proposition of teaching the placement of the transducers on the inside or outside of the housing. The limitation regarding the placement of the transducers on the outside surface of the housing was deleted from Claim 21 in the Supplemental Amendment filed by Applicants on April 9, 2003 and acknowledged by

the Examiner. Applicants also note that Scharton is directed to cleaning tubes in a heat exchanger, not a nuclear fuel assembly, and does not teach or suggest a housing configured to receive an irradiated nuclear fuel assembly. Therefore, Scharton is non-analogous art and, in any case, does not supply any of the necessary teaching beyond the other cited references.)

When rejecting claims under 35 U.S.C. § 103, the Examiner bears the burden of establishing a prima facie case of obviousness. To establish a prima facie case of obviousness, three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the reference teachings. Next, there must be reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest each and every limitation of the claimed invention. Both the suggestion or teaching to create the claimed invention and the reasonable expectation of success must both be found in the prior art, not in the Applicants' disclosure. If any of these criteria is not satisfied, prima facie obviousness has not been established.

The Examiner has not established a prima facie case of obviousness because there is neither the requisite motivation to combine Walter with either Kato or Yokokawa nor an expectation of success in such combination. Kato teaches a movable device holding ultrasonic transducers that traverses the length of the fuel assembly (col. 6, lines 12-19). The ultrasonic transducers are placed in a particular arrangement, which at most includes two rows of transducers (Figs. 6-9). The physical arrangement of the transducers as taught by Kato is indicative of transducers that produce planar energy waves. For example, Kato teaches that the arrangement of the transducers is such that the ultrasonic waves emitted from the transducers are directed to the sides of the channel box (col. 6, lines 55-62). The fact that Kato teaches that the transducers have to be arranged in a particular manner to direct their ultrasonic waves toward a given side of the channel box is indicative of a transducer that produces a planar energy wave. Therefore, Kato does not teach or suggest the use of transducers that produce omnidirectional ultrasonic energy waves as recited in independent Claim 21, and the Examiner has acknowledged that Kato does not teach transducers that produce omnidirectional ultrasonic energy.

Moreover, the placement or orientation of the transducers as taught by Kato is premised on the fact that the transducers produce planar waves. For example, Kato performed experiments to determine the angles of placement of the transducers relative to each other to optimize cleaning of the fuel assembly (col. 7, lines 39-65). Kato describes the

waves as being incident at right angles to the channel box by positioning the transducers parallel to the fuel assembly (col. 7, lines 42-51). Clearly, the only way in which waves will be incident at a right angle when the transducer is parallel to the fuel assembly is by production of a planar energy wave—not an omnidirectional wave. Therefore, it can be concluded that the placement or orientation of the transducers as taught by Kato is based on the use of transducers that produce planar energy waves.

Yokokawa teaches virtually nothing about transducers, including, in particular, the use of transducers that produce omnidirectional ultrasonic energy waves. In fact, Yokokawa only describes an "ultrasonic washing apparatus 4" (page 8, 11) and an ultrasonic-oscillation device 4 that appears to use an oscillator mounted 100 mm from the fuel assembly (page 12, 14). Figure 3 of Yokokawa shows the ultrasonic washing apparatus 4 as an individual block. Even assuming, *arguendo*, that Yokokawa teaches the use of four of these blocks, there would presumably be one block on each side of fuel assembly. In other words, Yokokawa teaches essentially an orientation for the ultrasonic-oscillation device that is indicative of the use of planar energy waves. Therefore, Yokokawa does not teach or suggest the use of transducers that produce omnidirectional ultrasonic energy waves, and the Examiner has acknowledged that Yokokawa does not teach transducers that produce omnidirectional ultrasonic energy. Moreover, similar to Kato, the placement or orientation of the oscillation device as taught by Yokokawa is premised on the fact that the oscillation device produces planar waves.

The Examiner applies Walter to supply the deficient teachings of Kato and Yokokawa. The Examiner states that it would be obvious to make the modification of using the transducer of Walter in the invention of either Kato or Yokokawa because "such modification is no more than the use of well-known type [sic] and method [sic] of placement of ultrasonic transducers for cleaning nuclear fuel components". However, the Examiner has not shown either the requisite motivation to combine Walter with either Kato or Yokokawa or an expectation of success in such combination.

First, the Examiner appears to be relying on the reference to Walter in Applicants' specification as the basis for the conclusion that it would be obvious to modify either Kato or Yokokawa with the transducer taught by Walter. This is clearly an impermissible use of hindsight to establish that there is a motivation to combine these references. Further, the fact that these references *could* be combined is not sufficient to establish a prima facie case of obviousness or motivation to combine. To simply conclude that the substitution of

omnidirectional energy waves from transducers whose placement or orientation optimized for cleaning a fuel assembly using planar waves does not provide the requisite motivation for such combination. Moreover, since cleaning of nuclear fuel assemblies is potentially dangerous and highly controlled, simply replacing planar wave transducers with omnidirectional energy wave transducers would not be readily done.

Second, the Examiner has not shown that there would be a reasonable expectation of success in the proposed combination of references. One familiar with the use of planar waves in ultrasonic cleaning of fuel assemblies would not be inclined to expect success in substituting a transducer that produces different energy waves into a physical arrangement of transducers that is based upon the use of planar waves. As stated above, the placement or orientation of the transducers in Kato and the oscillation device in Yokokawa are based upon the use of planar energy waves. More specifically, Kato teaches specific arrangements for transducers that produce planar waves to optimize cleaning. In fact, Kato had to perform testing to determine the optimized orientations for transducers that produce planar waves. Therefore, one of skill in the art would not expect similar cleaning results, without more, by simply substituting a different transducer (i.e., one that produces omnidirectional waves) in an orientation optimized for planar waves.

With respect to claims 24 and 26, the Examiner has not shown each and every element of this claim based upon the cited references. Neither Kato or Yokokawa, alone or in combination with Walter or Scharton teach or suggest the placement of transducers along the entire length of the housing. Kato teaches at most two rows of transducers that are attached to a movable device that traverses the length of the fuel assembly (col. 6, lines 12-19; Figs. 6-9). Such is not a plurality of transducers positioned along an entire length of a housing that receives a nuclear fuel assembly. Further, the structure to which the transducers are attached in Kato is not an elongated housing. Yokokawa only teaches, at best, one row of oscillators, which also is not a plurality of transducers positioned along an entire length of a housing that receives a nuclear fuel assembly.

With respect to claim 25, the Examiner has not shown each and every element of this claim based upon the cited references. Neither Kato or Yokokawa, alone or in combination with Walter or Scharton teach or suggest transducers that have an elongated rod that is positioned substantially parallel to the elongated housing. Applicants have not found any discussion in Kato or Yokokawa that teaches the positioning of an elongated transducer as parallel to an elongated housing. In fact, as noted above, the housing to which the

transducers are attached in Kato is not elongated. Therefore, even assuming, *arguendo*, that Walter could be combined with either Kato or Yokokawa, there is still no teaching or suggestion regarding the orientation of the elongated rod of the transducer relative to an elongated housing.

(Again, Applicants note that the Examiner also applied Scharton in combination with Walter to Kato or Yokokawa for the proposition of the transducers being on either the inside or outside of the housing. As explained above, the limitation of the transducers being on the outside of the housing was deleted. Also, Scharton, as non-analogous art, does not provide any additional teaching to overcome the deficiencies of the remaining cited references. Notably, the Examiner states that claim limitations such as "to receive an irradiated nuclear fuel assembly" do not serve to patentable distinguish the claimed structure over that of a reference as long as the structure of the cited reference is capable of performing the intended use. Clearly, Scharton, which is directed to a heat exchange, is not capable of receiving a nuclear fuel assembly.)

With respect to new Claims 30-36, dependent Claim 30 (dependent on Claim 21) and dependent Claim 33 and independent Claim 34 are directed to an apparatus for cleaning an irradiated nuclear fuel assembly comprising, at least in part, a particular reflector. None of the cited references teach or suggest such a reflector. New independent Claim 31 is directed to an apparatus for cleaning an irradiated nuclear fuel assembly comprising, at least in part, transducers that produce ultrasonic energy waves having a node structure that is an approximate multiple of said spacing between the fuel rods of a nuclear fuel assembly. Claim 32 is dependent upon Claim 31 and further recites the approximate multiple as being one. Claim 35 is dependent upon independent Claim 34, and Claim 36 is dependent upon Claim 35, which recites that the transducers comprise an elongated rod positioned substantially parallel to the direction of the elongated housing. Again, as discussed above, none of the cited references teach or suggest this positioning.

Based on the foregoing, Applicants respectfully request withdrawal of the rejection of Claims 21-26 and 29 and request allowance of these claims and new Claims 30-36.

Conclusion

In view of the above considerations, Applicants respectfully request a timely Notice of Allowance in this application. The Examiner is invited to call the undersigned attorney if a telephone call could help resolve any remaining items.

Applicants believe that an extension fee of $110.00 is due with this submission. Please charge the required fee to Pennie & Edmonds LLP Deposit Account No. 16-1150. A copy of this sheet is enclosed.

Respectfully submitted,

PENNIE & EDMONDS LLP

Date: October 9, 2003 By: _____ 40,756

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